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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/084,405	02/25/2002	Srinivasan Viswanathan	103.1061.01	8754

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MOUNTAIN VIEW, CA 94039-0013

EXAMINER
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TRUONG, BAO Q

ART UNIT	PAPER NUMBER
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2187

DATE MAILED: 05/25/2004

7

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/084,405

Applicant(s)

VISWANATHAN ET AL.

Examiner

Bao Q Truong

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 24 March 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-16, 18 and 19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 5, 8, 13 and 16 is/are allowed.
- 6) ☒ Claim(s) 1-4, 6, 7, 9-12, 14, 15, 18 and 19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

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1. The examiner acknowledges the applicant's submission of Amendment for Application No. 10/084,405 dated on 24 March 2004. Claims 1, 5, 8-9, 13, and 16 have been amended; claim 17 has been cancelled; claims 18-19 have been added. The application has a total of 18 claims pending. There are 6 independent claims and 12 dependent claims, all of which are ready for examination by the examiner.

*Drawings*

2. The replacement drawing sheet of figure 3 were received on 24 March 2004. This drawing is acceptable for examination purposes.

*Claim Rejections - 35 USC § 102*

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-2, 6-7, 9-10, 14-15, and 18-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Kedem (U.S. Patent No. 6,154,853).

Referring to claim 1, Kedem teaches, in a computer system having a file system that controls reads and writes to a set of disks (see figure 1: elements 12a-n; and figure 2: elements 22a-n, 24), a RAID subsystem provide redundancy among groups of said disks (see figure 2), a method including:

identifying one or more disks to be made temporarily inactive so as to permit movement of said identified disks as a storage device among the active set of storage devices has been identified as entering a failing state (see figures 4-6: element 34 and column 4: lines 63-66), will be taken off line (see column 5: lines 37-39), and will be replaced (see column 2: lines 41-43 and column 7: lines 8-11);

responding, by said file system, to said identification by marking said identified disks read-only as placing a logical volume, which is part of a RAID group, in a write-disable state (see figure 4: RAID group 41, volume D2; column 4: lines 28-47; and column 5: lines 21-36); and

indicating when said inactive disks are made active again as indicating when the fail device is replaced and RAID configuration is resumed (see column 7: lines 8-11).

As to claim 2, Kedem further teaches that said identifying includes a systems operator or the system itself determining that one or more disks are to be made temporarily inactive as the storage system identifying a storage device among the active set of storage devices as entering a failing state (see figure 4 and column 4: lines 63-66).

As to claims 6-7, Kedem further teaches that said indicating includes a systems operator or the system itself determining that one or more inactivated disks should be reactivated and said indicating further includes identifying the disk or disks to the system that should be reactivated as the storage system sends to the controllers a signal indicating when the fail device is replaced

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and causing the controllers to resume reading and writing data in RAID configuration (see column 7: lines 8-11).

As to claim 18, Kedem further teaches steps of:

making said identified disks temporarily inactive as taking off line (see column 5: lines 37-39) and replacing the failed disk (see column 2: lines 41-43 and column 7: lines 8-11); and

permitting reads of data on said inactive disks using a reconstruct on read technique while said identified disks are being moved as reads of data blocks of the failed disk are allowed by reconstructing data blocks of the failed disk from other blocks, including parity block, in the RAID system (see column 5: lines 39-54).

Referring to claim 9, Kedem discloses, in a computer system having a file system that controls reads and writes to a set of disks (see figure 1: elements 12a-n; and figure 2: elements 22a-n, 24) in which a RAID subsystem provides redundancy among groups of said disks (see figure 2), an apparatus including a memory and a processor (see figure 1-2), wherein said memory includes

an instruction for identifying one or more disks to be made temporarily inactive so as to permit movement of said identified disks as an instruction executed by the storage system to identify that a storage device among the active set of storage devices entering a failing state (see figures 4-6: element 34 and column 4: lines 63-66) so as to replace the failed disk (see column 2: lines 41-43 and column 7: lines 8-11);

an instruction for responding, by said file system, to said identification by marking said identified disks read-only as an instruction executed by the storage system to place a logical volume, which is part of a RAID group, in a write-disable state (see figure 4: RAID group 41, volume D2; column 4: lines 28-47; and column 5: lines 21-35); and

an instruction for indicating when said inactive disks are made active again as an instruction executed by the storage system to indicate when the fail device is replaced and RAID configuration is resumed (see column 7: lines 8-11).

As to claim 10, Kedem further discloses that said instruction for identifying includes an instruction initiated by a systems operator or the system itself determining that one or more disks are to be made temporarily inactive as an instruction executed by the storage system to identify a storage device among the active set of storage devices as entering a failing state (see figure 4 and column 4: lines 63-66).

As to claims 14-15, Kedem further teaches that said instruction for indicating includes an instruction initiated by a systems operator or the system itself for determining that one or more inactivated disks should be reactivated; and said instruction for indicating further includes an instruction for identifying the disk or disks to the system that should be reactivated as an instruction, initiated by the storage system, sending a signal to the controllers indicating when the fail device is replaced and causing the controllers to resume reading and writing data in RAID configuration (see column 7: lines 8-11).

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As to claim 19, Kedem further discloses that said memory further includes an instruction to make said identified disks temporarily inactive as an instruction, executed by the storage system, taking off line (see column 5: lines 37-39) and replacing the failed disk (see column 2: lines 41-43 and column 7: lines 8-11); and

an instruction to permit reads of data on said inactive disks using a reconstruct on read technique while said identified disks are being moved as an instruction, executed by the storage system, allowing reads of data blocks of the failed disk by reconstructing data blocks of the failed disk from other blocks, including parity block, in the RAID system (see column 5: lines 39-54).

*Claim Rejections - 35 USC § 103*

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 3-4 and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kedem (U.S. Patent No. 6,154,853).

As to claim 3-4, Kedem teaches a step of marking the temporarily inactive disk as read-only.

However, Kedem does not clearly teach that said marking includes recording in one of a set of off-line markers that said disk is read-only and each of said off-line markers is associated with a disk in the RAID subsystem.

It would have been obvious to one having an ordinary level of skill in the art at the time the invention was made to include, in the method taught by Kedem, that said marking includes recording in one of a set of off-line markers that said disk is read-only and each of said off-line markers is associated with a disk in the RAID subsystem. This would have been obvious because using a status bit/marker is a typical and easy way to record the status/state, for example read-only state, for each individual device in a computer system.



As to claim 11-12, Kedem discloses an instruction of marking the temporarily inactive disk as read-only.

However, Kedem does not clearly disclose that said marking includes an instruction for recording in one of a set of off-line markers that said disk is read-only and each of said off-line markers is associated with a disk in the RAID subsystem.

It would have been obvious to one having an ordinary level of skill in the art at the time the invention was made to include, in the apparatus disclosed by Kedem, that said marking includes an instruction for recording in one of a set of off-line markers that said disk is read-only and each of said off-line markers is associated with a disk in the RAID subsystem. This would have been obvious because using a status bit/marker is a typical and easy way to record the status/state, for example read-only state, for each individual device in a computer system.

### *Response to Arguments*

7. Applicant's arguments filed on 24 March 2004 have been fully considered but they are not persuasive.

Regarding to claims 1 and 9, the applicant argues on pages 12-14 that Kedem does not teach permitting "movement of the disks, which may (or may not) be fully functional before being moved" and that Kedem does not teach permitting "movement of the disks". The examiner disagrees and directs the applicant's attention to the language of claims 1 and 9, column 2: lines 41-43, column 4: lines 63-66, column 5: lines 21-36, and column 7: lines 8-11). First of all, the languages of both claims 1 and 9 do not indicate whether or not the disks are fully functional before being move. Secondly, nowhere in the specification of the application the examiner can

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find teaching of movement of disks that is functional before being moved. The teaching of the application, in light of the specification, is about dynamically replacing of a damaged disk in a RAID group. Finally, in Kedem teaching, when a disk in a RAID system entering a failing state (see column 4: lines 63-66), the failed disk will be taken off line (see column 5: lines 37-39), and will then be replaced (see column 2: lines 41-43 and column 7: lines 8-11); therefore, Kedem clearly teaches permitting "movement of the disks".

*Allowable Subject Matter*

8. Claims 5, 8, 13, and 16 are allowed.

*Conclusion*

9. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

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10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bao Q Truong whose telephone number is (703) 308-7090. The examiner can normally be reached on Monday-Friday from 8:30 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald A Sparks, can be reached on (703) 308-1756. The fax phone number for the organization where this application or proceeding is assigned is (703) 746-7239.

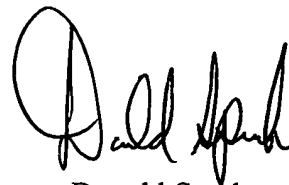
Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

*Bao Q Truong*

BT

Patent Examiner

20 May 2004



Donald Sparks

Supervisory Patent Examiner

Technology Center 2100